



UNITED STATES PATENT AND TRADEMARK OFFICE

CEW
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,276	10/09/2003	Takahiko Kawahara	33035M133	5971
441	7590	11/22/2005	EXAMINER	
SMITH, GAMBRELL & RUSSELL, LLP			MENEFEE, JAMES A	
1850 M STREET, N.W., SUITE 800				
WASHINGTON, DC 20036			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/681,276	KAWAHARA ET AL.
	Examiner	Art Unit
	James A. Menefee	2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 November 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 3,4 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 3,4 and 8-12 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Response to Amendment

In response to the amendment filed 11/7/2005, claims 5-7 and 13-20 are cancelled and claims 3, 8, 9, and 12 are amended. Claims 3-4 and 8-12 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-4, 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "said electrically conductive layer" in the third to last line. There is insufficient antecedent basis for this limitation in the claim. When the limitations were previously recited in now cancelled claim 5, the structure included such a layer therefore antecedent basis was proper. After the amendment "a second conductivity type cladding layer" replaces the "electrically conductive layer" therefore the claim is examined as if the second electrode were connected to the second conductivity type cladding. Correction is required.

Claim 4, 8-11 are rejected as depending on claim 3 and thus including this problem.

Claim 12 likewise recites the limitation "said electrically conductive layer" which lacks antecedent basis. See lines 20 and 21. Applicant has similarly replaced the prior "electrically conductive layer" with "a second conductivity type cladding layer" and the claim is examined as if the electrodes are connected to these cladding layers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (US 6,542,525) in view of Inaba et al. (US 6,678,299).

Independent claims:

Regarding claim 3, Matsumoto discloses as in Figs. 2 and 8-9 a semiconductor optical device comprising a first conductivity type semiconductor substrate 12 having a main surface, a stripe shaped optical waveguide 96 disposed on said main surface and including an active layer 92, a current blocking part 27 disposed on said substrate including a blocking layer 22 having a thickness over 1 μ m (col. 9 line 44) and being InP doped with Fe and having said waveguide buried therein, a second conductivity type cladding 18b disposed on said optical waveguide and current blocking part, a first electrode 36 electrically connected to the substrate and a second electrode 88 electrically connected to the second conductivity type cladding, and a trench 5 having a bottom in contact with the blocking part, an insulating film 32 disposed on a surface of the trench. The Fe dopant concentration is not disclosed.

Regarding claim 12, Matsumoto discloses as in Figs. 2 and 8-9 a semiconductor optical integrated device comprising a first conductivity type semiconductor substrate 12 having a main surface including a laser region 86 and a modulation region 82 arranged in a predetermined

direction, a stripe shaped first optical waveguide 96 longitudinally extending in the predetermined direction on the laser region, a second optical waveguide 20 longitudinally extending in the predetermined direction on the modulation region, a current blocking part 27 disposed on said substrate including a blocking layer 22 having a thickness over 1 μm (col. 9 line 44) and having InP doped with Fe and having both of said waveguides buried therein, a second conductivity type cladding layer 18b disposed on said waveguide and blocking part in each of the regions, a first electrode 36 electrically connected to the substrate, a second electrode 88 electrically connected to the second conductivity type cladding layer on the laser region, and a third electrode 3a electrically connected to the second conductivity type cladding layer of the modulator region, a trench 5 extending in the predetermined directions and having a bottom in contact with the blocking part in both regions, an insulating film 32 disposed on a surface of the trench, each of the optical waveguides comprises first conductivity type semiconductor 14,90, active layer 16,92, and second conductivity type semiconductor layer 18a,94, the active layer between the two semiconductor layers. The Fe dopant concentration is not disclosed.

As noted, it is not disclosed that the Fe dopant concentration falls within the ranges as claimed. Matsumoto is totally silent as to the dopant concentration. One skilled in the art would surely recognize that there must be *some* dopant concentration; by definition the dopant must be included at some dopant concentration. So the question is: what concentration would one skilled in the art use? Matsumoto's layer 22 performs the function of current blocking, therefore one skilled in the art would have looked to prior art to see what type of dopant concentrations are used in InP current blocking layers doped with Fe. Inaba shows current blocking layers 17 made of InP doped with Fe at $5 \times 10^{16} \text{ cm}^{-3}$, falling within the claimed ranges. See col. 5 line 66 – col.

6 line 7. It would have been obvious to one skilled in the art to choose the known dopant concentration because it has been shown to be effective in making such a layer current blocking, which is the entire purpose of the layer in Matsumoto.

Dependent claims:

Regarding claim 4, the current blocking part 27 further includes hole blocking layer 24 that is InP having conductivity opposite that of the conductive layer (n type vs. p type).

Regarding claim 8, the insulating film 32 is made of a silicon compound. Col. 7 line 32.

Regarding claim 9, the optical waveguide 96 comprises first conductivity type semiconductor 90, active layer 92, and second conductivity type semiconductor 94, the active layer being between those two layers.

Regarding claims 10-11, the device may be a modulator or laser.

Response to Arguments

Applicant's arguments ("remarks") filed 11/7/2005 have been fully considered but they are not persuasive.

Applicant first argues against the 102 rejection based on Inaba. Remarks at 6-7. This rejection is withdrawn in light of applicant's amendments, therefore these arguments are moot.

Applicant next argues against the 103 rejection based on Matsumoto in view of Inaba. Remarks at 7-8. As noted in the above rejections, Matsumoto discloses all of the claimed limitations except for the Fe concentration of the blocking layer. Inaba teaches that blocking layers having such an Fe concentration are known. Applicant's argument is that Matsumoto and Inaba cannot be combined. Remarks at 8. Particularly, it is argued that "Inaba does not recognize

the problem to be solved by the present invention" and that "those of ordinary skill in the art would not have looked to Inaba, disclosing only a laser, in order to modify the balanced combination in Matsumoto of a laser and a modulator." *Id.*

Applicant's first argument, that Inaba does not recognize the problem to be solved by the present invention, appears to be an argument that Inaba is not analogous art. References may only be applied under section 103 if they are analogous, and to be analogous "the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." MPEP 2141.01(a) (quoting *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)). While Inaba may or may not be reasonably pertinent to applicant's particular problem, Inaba is certainly within the same field of endeavor and therefore is analogous art.

Inaba is drawn to a semiconductor laser device. *See, e.g.*, Inaba, Title. Applicant states in the specification under "Field of the Invention" that "The present invention relates to . . . a semiconductor laser device . . ." *See* p. 1, par. [0001]. This alone should be dispositive, but the examiner goes further. It makes no sense to preclude the use of general laser references because applicant's device includes not only a laser but also a modulator. A hypothetical will help: suppose an applicant claims a computer system using a particular type of monitor. Computer systems including monitors are surely known; would one skilled in the art then ignore the general monitor art? It seems certain that one skilled in the art would consider general monitor references in determining whether the combined computer and the special monitor are obvious. In the same way, one skilled in the art would consider general lasers in determining whether the combined laser and modulator are obvious.

Additionally, the applicant does not even claim the device as an integrated device until claim 12; applicant first claims it as merely an optical device (claims 3-4, 8-9), then as either a laser or a modulator (claims 10-11). If lasers are not within applicant's field of endeavor, how can applicant claim the device as a laser in claim 10? Applicant cannot leave a wide open field of endeavor for claiming, then narrowly construe that field for prior art purposes. One skilled in the art would understand that not only are integrated laser/modulator devices relevant to the invention, but also separate lasers and modulators, in particular those that have similar current confining structures such as Inaba.

Applicant's second argument, that one skilled in the art would not use a laser current blocking layer in an integrated laser and modulator, is similarly without merit. As noted in the above rejections, Matsumoto discloses the claimed invention except is silent as to Fe concentration. It makes little sense to suggest that one skilled in the art, in looking for such a concentration, would only look for current blocking layers in integrated laser/modulator devices.

"To justify combining reference teachings in support of a rejection it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981) (citations omitted); see also *In re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) ("Combining the teachings of

references does not involve an ability to combine their specific structures.”). Inaba and Matsumoto are not being physically combined; the teachings of Inaba are merely being applied to a particular layer of Matsumoto. Using Inaba’s particular concentration will not change Matsumoto’s principle of operation nor render it inoperable. As noted, Matsumoto must have *some* concentration; it is merely silent as to that feature therefore one skilled in the art must look elsewhere to determine a proper concentration. Inaba is used for the teaching that the particular blocking layer is known in the art as used in laser systems, and there appears to be no reason that one skilled in the art would not consider such a teaching. The skilled artisan would recognize that a current blocking layer works similarly in a laser and in an integrated laser/modulator. Indeed half of Matsumoto’s laser/modulator is a laser, therefore one skilled in the art would surely look to laser current blocking layers in determining obviousness.

In sum, the references used by the examiner in the rejections are analogous art, and one skilled in the art would not ignore lasers in looking for integrated laser/modulator current blocking layer. Applicant makes no other arguments as to the merits of the rejection, therefore the rejections are deemed proper and this action is made final.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James Menefee
November 14, 2005